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A previous study conducted by Weitz, Clarke, and Jones reported that college women who expressed a preference for some major field of study at the time they entered college showed only a slight difference (not statistically significant) in academic performance during their first semester when compared with women who were undecided about their major. The present study, by Weitz and Colver, was undertaken to see if a more rigorous study of the data and more adequate criteria of academic performance would confirm the findings of the early study. The findings in this study again indicated that the women who do not have educational goals clearly defined by a major field of study seem to perform in the academic situation about as well as those who do.

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VOLUME NINETEEN, NUMBER THREE, AUTUMN, 1959

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THE RELATIONSHIP BETWEEN THE EDUCATIONAL GOALS AND THE ACADEMIC PERFORMANCE OF WOMEN, A CONFIRMATION

HENRY WEITZ AND ROBERT M. COLVER
Duke University

A student with clearly defined educational goals might be expected to perform more effectively in the academic situation than a student whose goals were less clearly defined. Thus a student who enters college with some idea of his major field of concentration might be expected to earn higher grades than a student who was undecided at the time he entered college.

These expectations were confirmed in the case of college men in a study by Weitz, Clarke, and Jones (2) which reported that college men who, at the time they entered college, expressed a preference for some major field of study earned better grades during their first semester than men who were undecided about their major. This same study, however, reported that these conditions did not hold for women. Although there was a slight difference in academic performance in favor of the women expressing a major field preference, the difference was not statistically significant.

The authors speculated that the differences in results between men and women might be related to some sort of educational sex-typing in our culture. Yet the fact that the results for the women, although not statistically significant, were in the same general direction as those for the men suggested that a more rigorous study of the data or more adequate criteria of academic performance might confirm our expectations about the relationship between educational goals and academic performance.

Both approaches were undertaken in the present investigation to determine whether or not a relationship existed between the choice of a major field and the academic effectiveness of women college students. First, using substantially the same groups of students as

were available for the previous study, the present investigators subjected the first semester academic performance data to an analysis of covariance,[1] thus making it possible to utilize all available cases instead of the 100 matched pairs which were previously used. Secondly, the present investigation undertook to examine additional criteria of academic performance which became available since the previous study.

The Problem

In view of the previous findings, the following null hypothesis was tested:

The academic performance of college women who indicate preferences for major fields of study at the time they enter college does not differ from the academic performance of college women who are undecided about their major fields of study at the start of their programs.

Procedures

Students who enrolled as freshmen in the Woman's College (the undergraduate liberal arts college for women) of Duke University during the Fall Terms of 1951–1953 were used as subjects for the present study. Complete records necessary for this study were available for 815 of these students. This represents 97.8 per cent of the women entering during these three years.

During the orientation week program which precedes the opening of classes, these students are asked to fill out various questionnaires which ask, among other things, for the student's proposed major field of study and vocational objective. The students are instructed to record "not sure" when they are undecided about either of these choices. On the basis of these responses, the 815 women were divided into two groups as follows:

Group D (the "decided" group): Students who expressed a fairly clearly identifiable preference for a major field in one or more of the following ways:

a. They listed a major field of study.
b. They listed a vocational objective for which undergraduate

[1] The previous study used a treatment by level analysis of variance design.

or pre-professional training is available at Duke, as, for example, law, medicine, dentistry, social work, teaching.

c. They listed a field of study or a vocational objective for which Duke University offers closely related training, as, for example, journalism choices, which were assigned to English.

Group U (the "undecided" group): Students whose choice of a major could not be identified. These included students who made one or more of the following types of responses:

a. They recorded "not sure" for both major field and vocational objective.
b. They listed a major field in which Duke University offered no training, as, for example, architecture.
c. They recorded "not sure" for their major and listed two or more vocational objectives for which there was no common training, as for example, law and medicine.

This division of students yielded 351 in Group D and 464 in Group U. Thus we see that over 56 per cent of the women entering Duke University were unable (or unwilling) to indicate what they came to college to study.

As part of a Placement Testing Program, all students take, among other tests, a test of general scholastic aptitude, *The American Council on Education Psychological Examination for College Freshmen*, 1949 edition. The total score[2] on this test was used as the predictor variable in the statistical analysis of the data.

The following criteria of academic performance were used: (a) grade point average at the end of the first semester, (b) percentage of each group being graduated, (c) number of semesters required to graduate, and (d) grade point average at graduation.

At Duke, grade point averages are computed according to the following procedure: With A = 4, B = 3,C = 2, D = 1, and F = 0, multiply the numerical equivalent of each course grade by the number of semester hours for the course; then divide the sum of these products by the number of course hours in which the stu-

[2] A.C.E.P.E. total scores were converted to Duke stanines based upon a norm group of about 5,000 students entering all the undergraduate colleges at Duke during 1951–1955, inclusive. These scores have a mean of 5 and a standard deviation of 2 for the norm group.

dent was enrolled for the period of time in question. Thus, criterion "a" represents the student's academic performance for one semester, while criterion "d" represents her academic performance for all work taken toward her degree.

Criterion "b" represents the percentage of those freshmen assigned to groups D and U who subsequently graduated. The data for this study were collected in the spring of 1958. Thus students who entered in 1953 had nine semesters in which they could complete their work while those who entered in 1951 had thirteen. Although some of the original entrants were still in school at the time the data were collected, their number was small and would not effect the conclusions drawn here.

Criterion "c" represents the number of *regular term* semesters completed prior to graduation. Summer session semesters were not included because of the almost impossible task of interpreting summer credits in terms of semesters completed. Thus a student who progressed normally toward graduation completed eight semesters. A student who accelerated either by taking summer courses or a regular term course overload completed less than eight semesters before graduation. A retarded student who took no summer session courses required more than eight semesters to graduate. However, a retarded student who made up credits in summer session could have the same number of semesters recorded for this study as the normal progress student. Although this method of counting semesters completed to graduation is not as precise a measure as one might desire, it did serve to differentiate roughly between accelerated students and the rest.

An attempt was made to introduce a fifth criterion. This was to be the number of semesters completed at the time of separation (whether the student graduated or not), but the lack of precise definition indicated above became even more troublesome here and failed to differentiate between effective and ineffective academic performance. This criterion was, therefore, dropped.

An analysis of covariance[3] model as described by Walker and Lev (1) was used in testing the hypothesis with respect to criteria

[3] Data processing for the analysis of covariance, and other statistics reported here, was programmed by Mr. J. L. Clutter of the Duke University Computing Laboratory and carried out on an IBM Type 650 Data Processing Machine.

a, c, and d while a *t* test for uncorrelated percentages was used in testing with respect to criterion b.

The Findings

The Predictor Variable. The scholastic aptitude test scores were used as a predictor variable throughout the analyses of covariance. In the previous study (2, p. 31) the mean scholastic aptitude test score for Group D was shown to be higher than that of Group U by a statistically significant difference. Since the subjects of the present study are substantially the same[4] as those used in the previous study, this relationship still holds. Furthermore, when we consider only those students in both groups who were eventually graduated, the significant difference in scholastic aptitude stands up. Table 1 reports these data.

TABLE 1
Scholastic Aptitude Test Performance

	Group D			Group U			
Populatior	Number	Mean	S.D.	Number	Mean	S.D.	Difference
All Entrants	351	5.69	1.83	464	5.38	1.84	0.31*
Graduates Only	253	5.81	1.80	327	5.37	1.83	0.44**

* Significant beyond the 5% level.
** Significant beyond the 1% level.

First Semester Grades.[5] In the previous study, an analysis of variance (treatment by level) indicated that the main effect yielded no statistically significant differences (1, p. 34). When all 815 cases were used in an analysis of covariance applied to first semester grades, the same results were found. The difference between Group D and U with respect to the regression of first semester grade point average on the predictor variable was not significant ($F = .1473$). Thus, the assumption of homogeniety of regression was established. The main effect difference was found to be not significant ($F = 1.8697$). Thus the hypothesis is again confirmed by the present analysis.

[4] Twenty-three cases previously unclassified were assigned to Group U in the present study.

[5] An *F* test was applied to all criterion measures to test for homogeniety of variance between groups. No significant differences were found.

TABLE 2

Number and Percentage Graduated and Not Graduated

	Group D		Group U		Total	
Population	Number	%	Number	%	Number	%
Graduated	253	72.1	327	70.5	580	71.1
Not Graduated	98	27.9	137	29.5	235	28.8
All Entrants	351	100.0	464	100.0	815	99.9

Percentage Graduated. Table 2 reports the percentage of each group which were graduated. The difference of 1.6% graduated in favor of the "decided" group is not statistically significant. When we remember that scholastic aptitude is generally correlated with academic performance and that the D group exceeded the U group in scholastic aptitude, one might expect the percentage of D's being graduated to exceed the percentage of U's on the basis of scholastic aptitude alone. Yet the t value ($t = 0.5$) of this difference without correction for the effect of scholastic aptitude was what might have been expected by chance alone. Thus, we may say that the hypothesis of no difference in academic performance between these two groups is confirmed.

Semesters Completed. The D group, on the average, were graduated after completing 7.78 semesters while the U group, on the average, required 7.83 semesters to complete their work. Thus the D group was accelerated by some 0.05 semesters. This difference in favor of the "decided" students proved to be a chance difference ($F = 1.4114$). Again the null hypothesis is upheld.

Graduation Grade Point Average. At graduation, Group D had a mean grade point average of 2.84 while Group U had a grade point average of 2.75. This difference of 0.09 points in favor of the "decided" students proved to be a chance difference ($F = 2.9997$), thus supporting the null hypothesis.

In order to determine whether the persistance of a choice tended to influence academic performance, the "decided" graduated group was further subdivided into a group of women who were graduated in the same or closely related major field to that indicated in their freshman year, and a second group who were graduated in a major field different from that indicated in their freshman year. An analy-

sis of covariance of their academic performance using these two groups and the undecided group also yielded differences which might be expected by chance alone.

Summary

Table 3 summarizes the performance of the two groups on the criterion measures. As can be seen from this table, on every cri-

TABLE 3
Summary of Criterion Measures

Population	Group D		Group U	
	Mean	S.D.	Mean	S.D.
All Entrants	(N = 351)		(N = 464)	
First Semester Grade Point Average	2.52	0.65	2.43	0.59
Graduates Only	(N = 253)		(N = 327)	
First Semester Grade Point Average	2.61	0.60	2.48	0.56
Percentage of Students Graduated	72.07	44.85	70.47	45.06
Semesters Completed Before Graduation	7.78	0.49	7.73	0.46
Graduation Grade Point Average	2.84	0.42	2.75	0.43

terion measure Group D is favored over Group U. Yet as indicated in the foregoing report, none of these differences is statistically significant. Thus the hypothesis as initially stated is confirmed; namely, there is no difference in academic performance between women students who report a major field perference before starting their college program and those who are undecided at the start. This, then, confirms also the findings of the previous study.

Conclusions

We are forced to the conclusion by these findings that with respect to the kind of educational behavior investigated here, men and women operate differently. As suggested in the previous study, women seem to perform in the academic situation about equally well whether or not they have educational goals clearly defined by a major field of study. Apparently women come to college to "secure an education," and the content of that education seems to have little bearing on their performance.

This would seem to suggest, among other things, that secondary school guidance activities directed toward helping women students

clarify their major field choices may need to be reexamined in favor of more general kinds of educational guidance.

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